



Natural Resources Conservation Service  
P.O. Box 2890  
Washington, D.C. 20013

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**Weekly Report - Snowpack / Drought Monitor Update**

**Date: 3 February 2011**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 2 February 2011 shows many basins in the Cascades, Great Basin, Western Slope of the Colorado Rockies, Wasatch, and Southwest Ranges have deteriorated by one category during the past week (noted by red circles). Blue circles show one category improvement over New Mexico (Fig. 1). SNOTEL Snow-Water Equivalent percent of Normal peak shows that surpluses in Figure 1 aren't heading to average snowpack in late winter if the current drying trend continues. Most basins have less than 50% of peak at this point (we are now more than half way through the snow accumulation season). Parts of the Wasatch and Sierra are at peak values as of this week. However, most SNOTEL sites will need much more snow this season in order to finish with near normal SWE (Fig. 1a). SNOTEL 7-day snow depth changes show gains in accumulation across the Northern and Southern Rockies, Sierra, and Wasatch in Utah. Elsewhere, decreases are noted (Fig. 1b).

**Temperature:** A very cold morning across the West resulted in many SNOTEL stations breaking new record minimum temperatures today (Fig. 2). Average SNOTEL temperatures were much below normal over Montana but generally above normal for the week elsewhere across the West (Fig. 2a). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures over central Utah ( $+9^{\circ}\text{F}$ ) and the greatest negative departures over portions of Northern Montana ( $-15^{\circ}\text{F}$ ). Perhaps the coldest temperatures since January 1971 dominate New Mexico this morning (Fig. 2b).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 2 February shows the bulk of the heaviest precipitation confined central Washington (Fig. 3). In terms of percent of normal, the precipitation pattern was extremely wet over parts of the Central and Southern Rockies and Western High Plains (Fig. 3a). For the 2011 Water-Year that began on 1 October 2010, the greatest deficits are found over the extreme southern reaches of the Southwest. Areas with the highest values are found over the Great Basin. A rather dry week was the rule over much of the West which resulted in one category deterioration as noted by the red circles (Fig. 3b).

**The West:** Even though an inch or more of precipitation fell across parts of California and Washington, this is the rainy season and Normals are high, so most of the West had a drier-than-normal week. The few tenths of an inch of moisture that fell across parts of Arizona and New Mexico at the end of the week had little impact on the long-term deficits. So D2 expanded in southern Arizona, southern New Mexico, and the northern Trans Pecos of western Texas, essentially joining the previously existing D2 areas there. D0 expanded in central Arizona.  
Author: Richard Heim, NOAA/NESDIS/National Climatic Data Center.

***A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.***

## Weekly Snowpack and Drought Monitor Update Report

### **DROUGHT IMPACTS DEFINITIONS** (<http://drought.unl.edu/dm/classify.htm>)

The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 4 and 4a).

### **SOIL MOISTURE**

Soil moisture (Figs. 5a and 5b) is estimated by a one-layer hydrological model ([Huang et al., 1996](#), [van den Dool et al., 2003](#)). The model takes observed precipitation and temperature and calculates soil moisture, evaporation and runoff. The potential evaporation is estimated from observed temperature.

[http://www.cpc.ncep.noaa.gov/soilmst/index\\_jh.html](http://www.cpc.ncep.noaa.gov/soilmst/index_jh.html)

### **U.S. HISTORICAL STREAMFLOW**

[http://water.usgs.gov/cgi-bin/waterwatch?state=us&map\\_type=dryw&web\\_type=map](http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map).

This map, (Fig. 6) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.

### **STATE ACTIVITIES**

State government drought activities can be tracked at the following URL: <http://drought.unl.edu/mitigate/mitigate.htm>. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information - <http://www.wcc.nrcs.usda.gov/cqibin/bor.pl>.

Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/> and <http://drought.gov>.

### **FOR MORE INFORMATION**

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage -

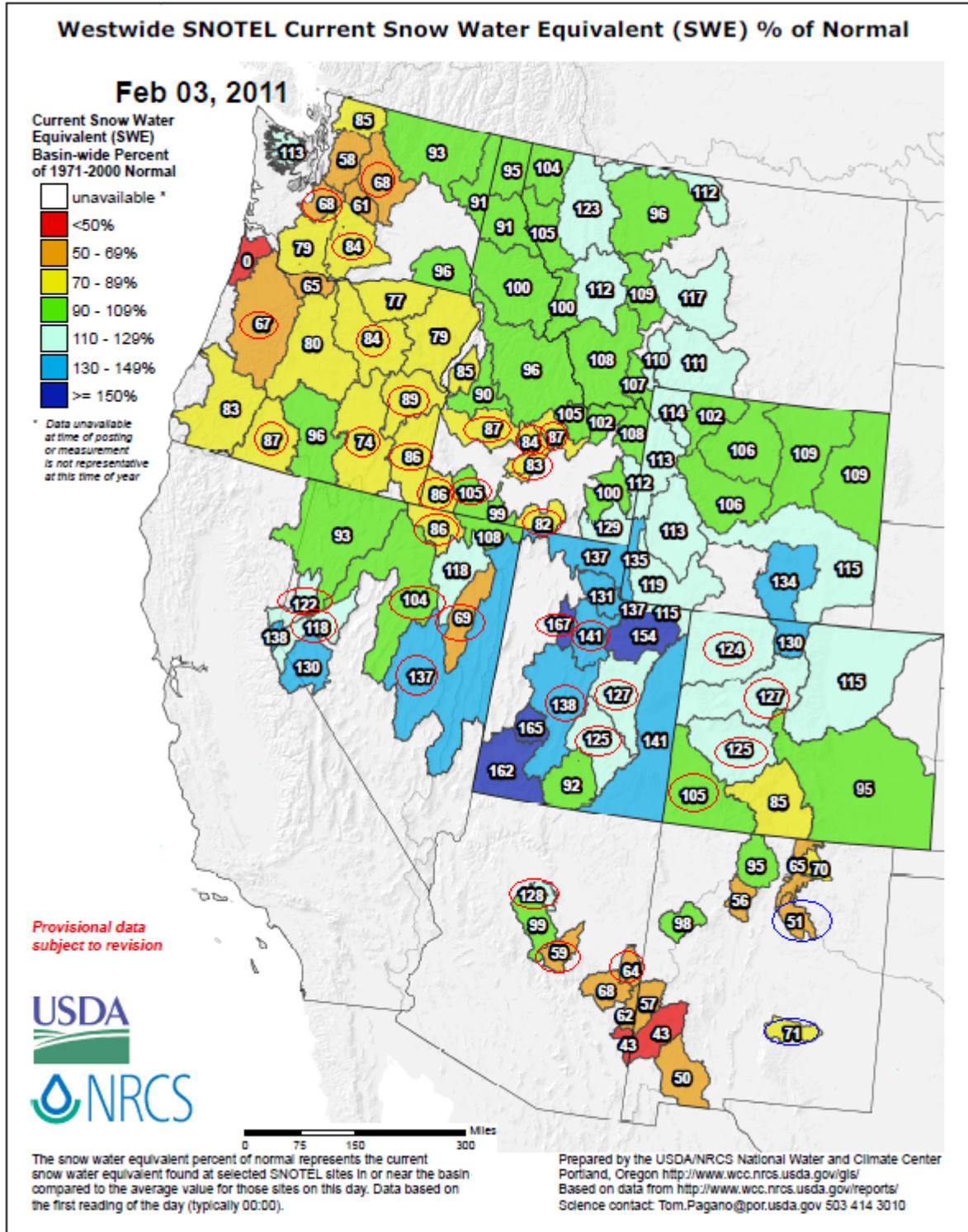
<http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ JEFF GOEBEL

Acting Director, Resource Inventory Division

## Weekly Snowpack and Drought Monitor Update Report

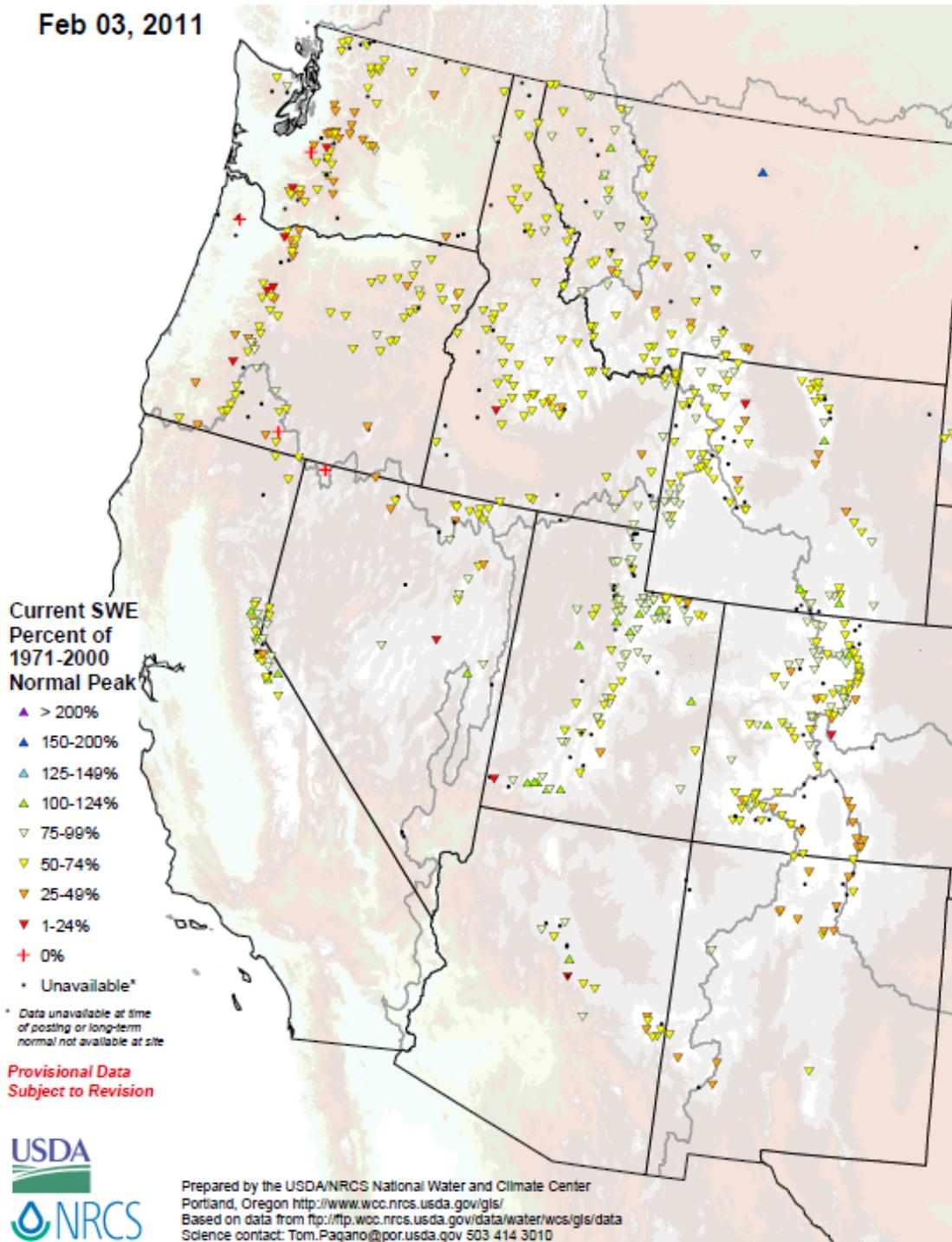


**Fig. 1: SNOTEL Snow-Water Equivalent percent of normal values for 2 February 2011 shows many basins in the Cascades, Great Basin, Western Slope of the Colorado Rockies, Wasatch, and Southwest Ranges have deteriorated by one category during the past week (noted by red circles). Blue circles show one category improvement over New Mexico.**

Ref: [http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west\\_swepctnormal\\_update.pdf](http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_swepctnormal_update.pdf)

## Weekly Snowpack and Drought Monitor Update Report

### SNOTEL Current Snow Water Equivalent (SWE) Percent of Normal Peak Feb 03, 2011



**Fig. 1a: SNOTEL Snow-Water Equivalent percent of Normal peak shows that surpluses in Figure 1 aren't heading to average snowpack in late winter if the current drying trend continues. Most basins have less than 50% of peak at this point (we are now more than half way through the snow accumulation season). Parts of the Wasatch and Sierra are at peak values as of this week. However, most SNOTEL sites will need much more snow this season in order to finish with near normal SWE.**

Ref: <http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideSWEPercentPeak.pdf>

# Weekly Snowpack and Drought Monitor Update Report

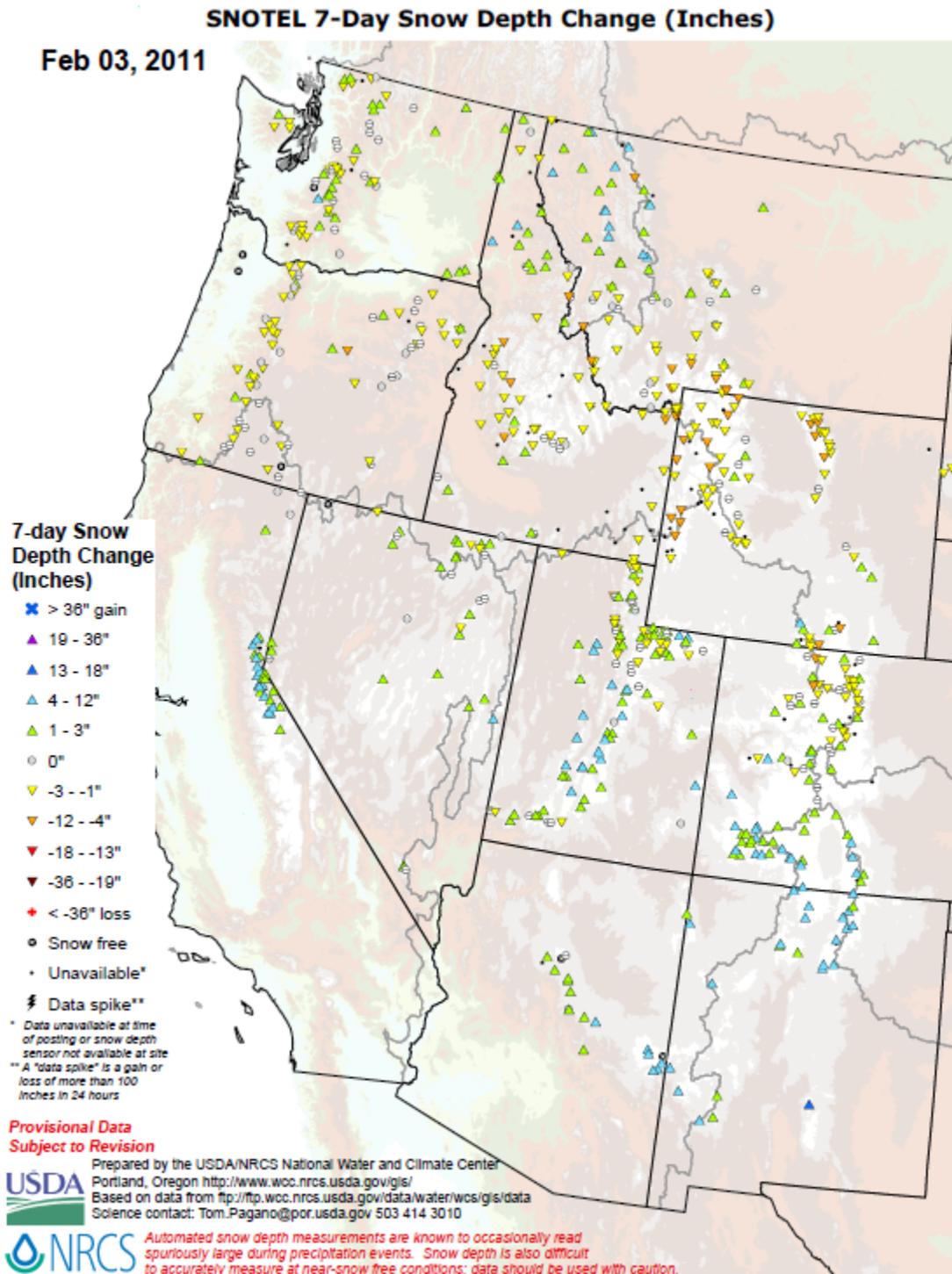
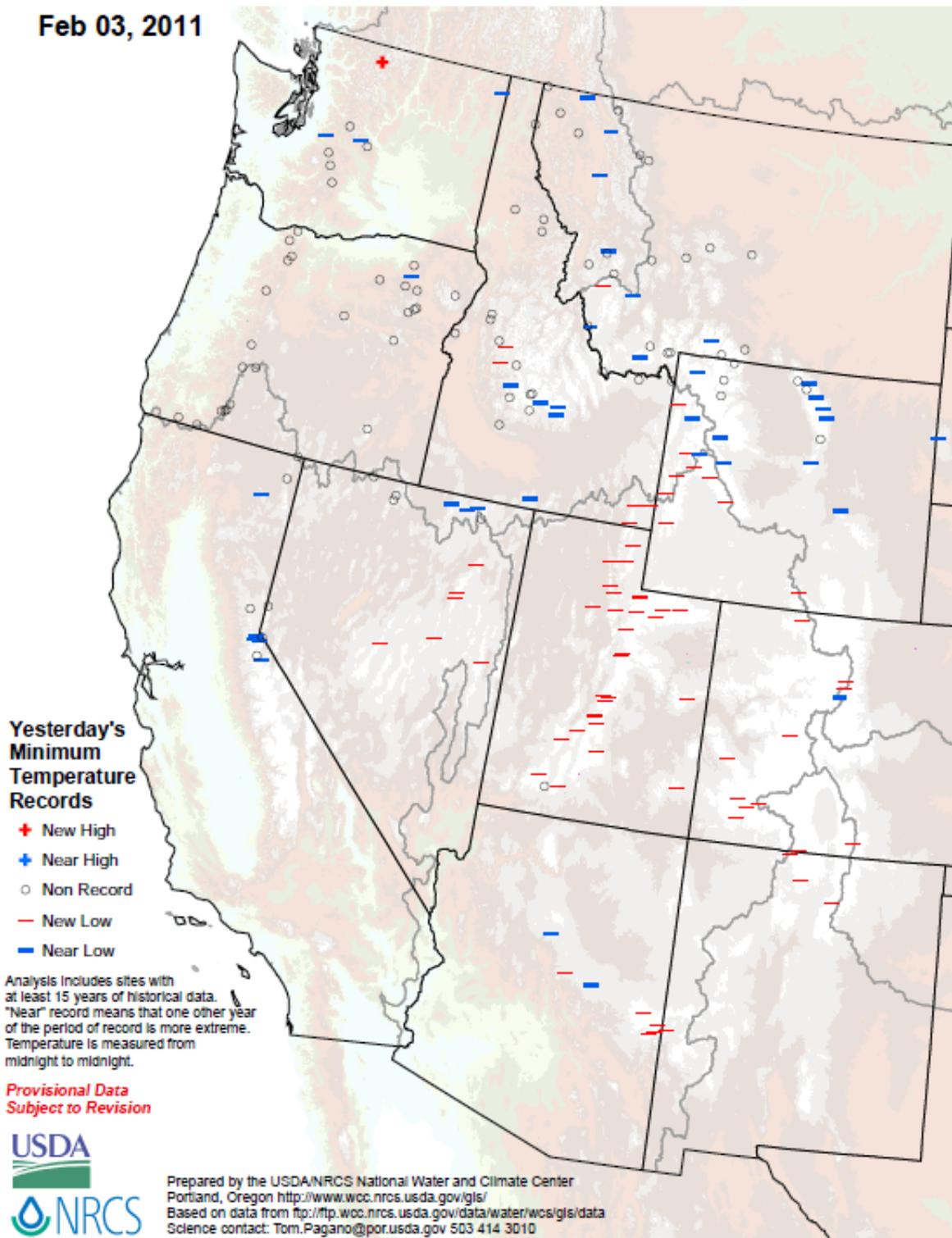


Fig. 1b: SNOTEL 7-day snow depth changes show gains in accumulation across the Northern and Southern Rockies, Sierra, and Wasatch in Utah. Elsewhere, decreases are noted.

Ref: [http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west\\_snowdepth\\_7ddelta.pdf](http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf)

**SNOTEL Yesterday's Minimum Temperature Records**

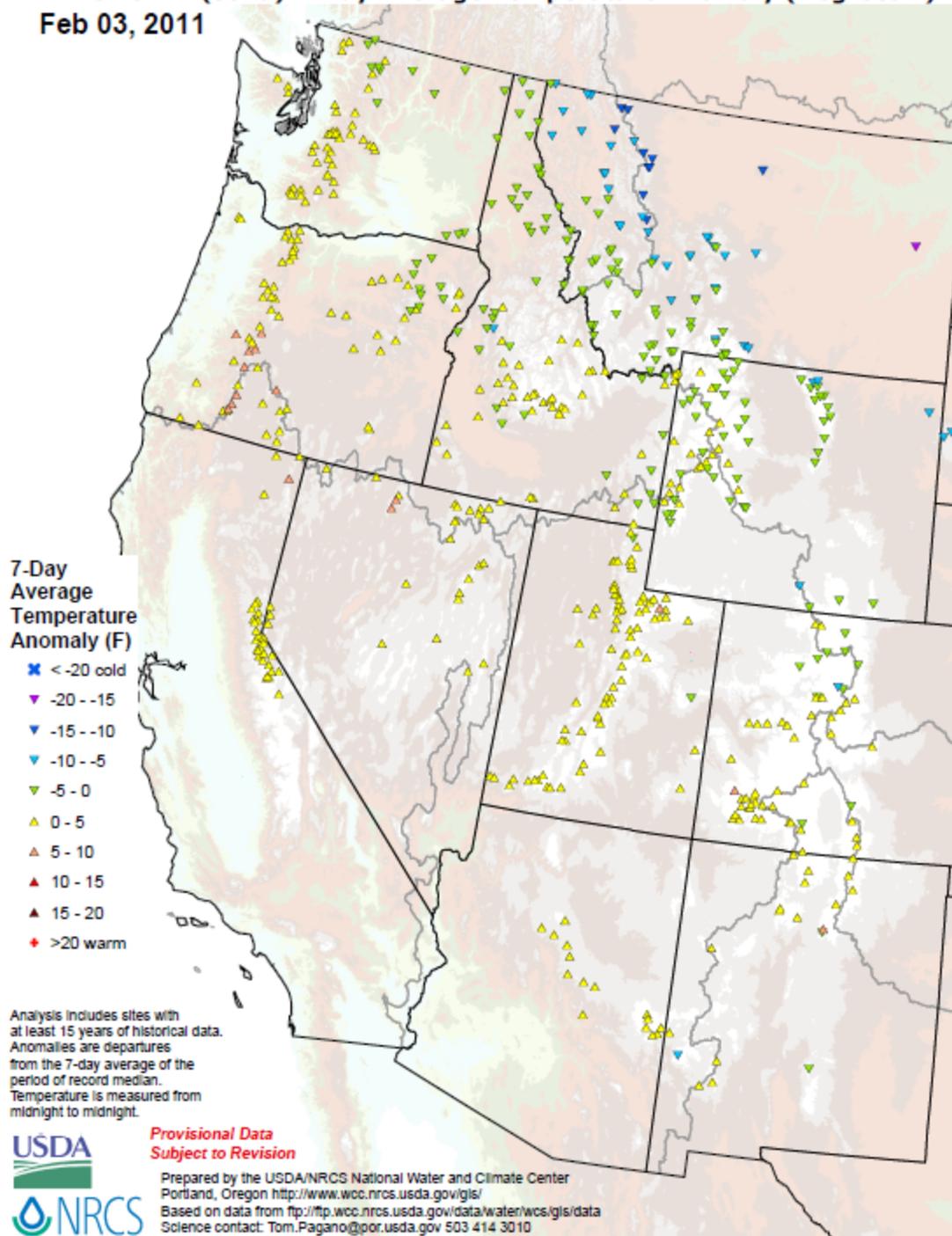
Feb 03, 2011



**Fig. 2: A very cold morning across the West resulted in many SNOTEL stations breaking new record minimum temperatures.** Ref: <http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideTminRecord.pdf>

## Weekly Snowpack and Drought Monitor Update Report

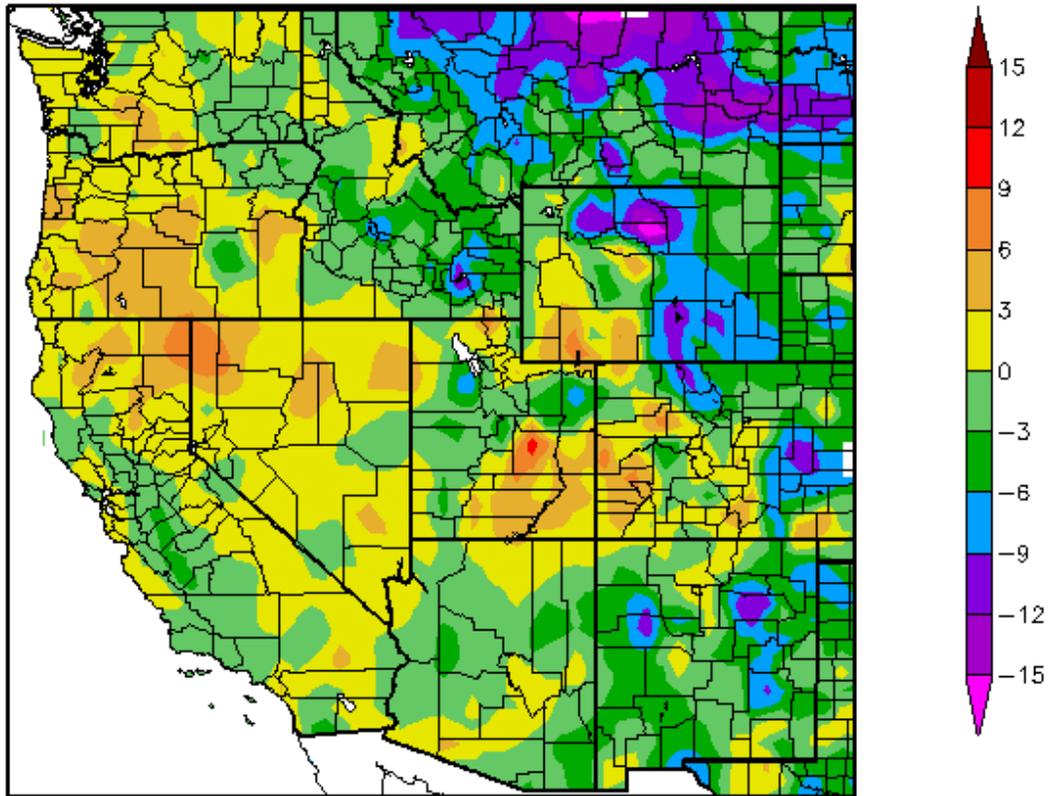
SNOTEL (solid) 7-Day Average Temperature Anomaly (Degrees F)  
Feb 03, 2011



**Fig. 2a: Average SNOTEL temperatures were much below normal over Montana but generally above normal for the week elsewhere across the West.** Ref: <http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf>

Weekly Snowpack and Drought Monitor Update Report

Departure from Normal Temperature (F)  
1/27/2011 – 2/2/2011



Generated 2/3/2011 at HPRCC using provisional data.

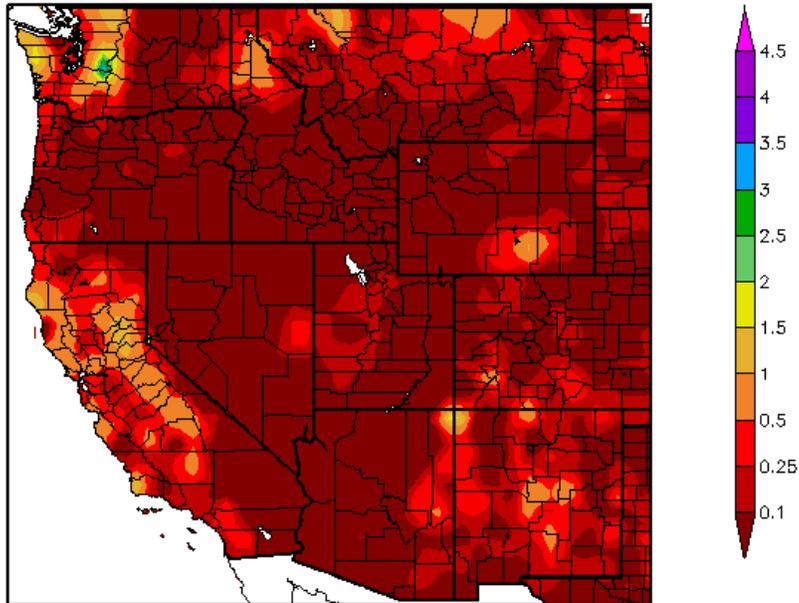
Regional Climate Centers

**Fig. 2b: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures over central Utah (>+9°F) and the greatest negative departures over portions of Northern Montana (<-15°F). Perhaps the coldest temperatures since January 1971 dominate New Mexico this morning.**

Ref: [http://www.hprcc.unl.edu/maps/current/index.php?action=update\\_daterange&daterange=7d](http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d)

## Weekly Snowpack and Drought Monitor Update Report

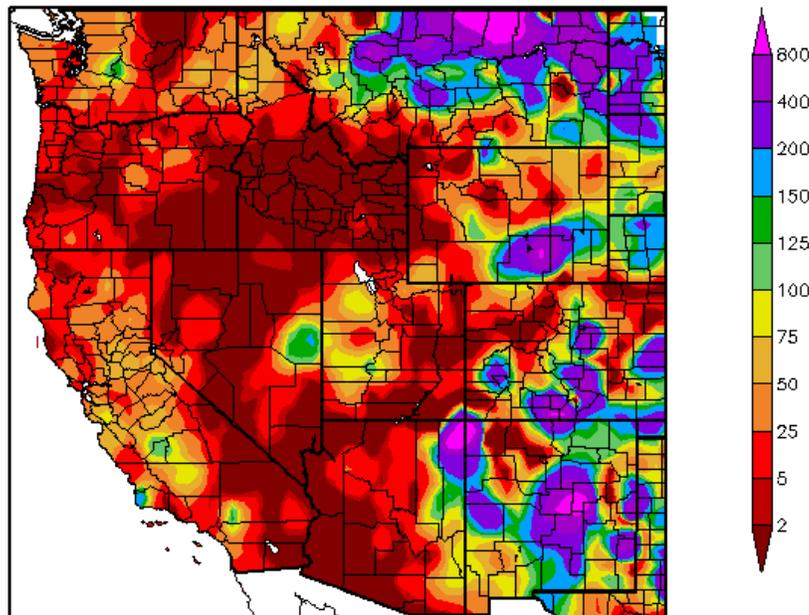
Precipitation (in)  
1/27/2011 - 2/2/2011



Generated 2/3/2011 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%)  
1/27/2011 - 2/2/2011



Generated 2/3/2011 at HPRCC using provisional data.

Regional Climate Centers

**Fig. 3 and 3a: ACIS 7-day average precipitation amounts for the period ending 2 February shows the bulk of the heaviest precipitation confined central Washington (Fig. 3). In terms of percent of normal, the precipitation pattern was extremely wet over parts of the Central and Southern Rockies and Western High Plains (Fig. 3a). Ref: <http://www.hprcc.unl.edu/maps/current/>**

Weekly Snowpack and Drought Monitor Update Report

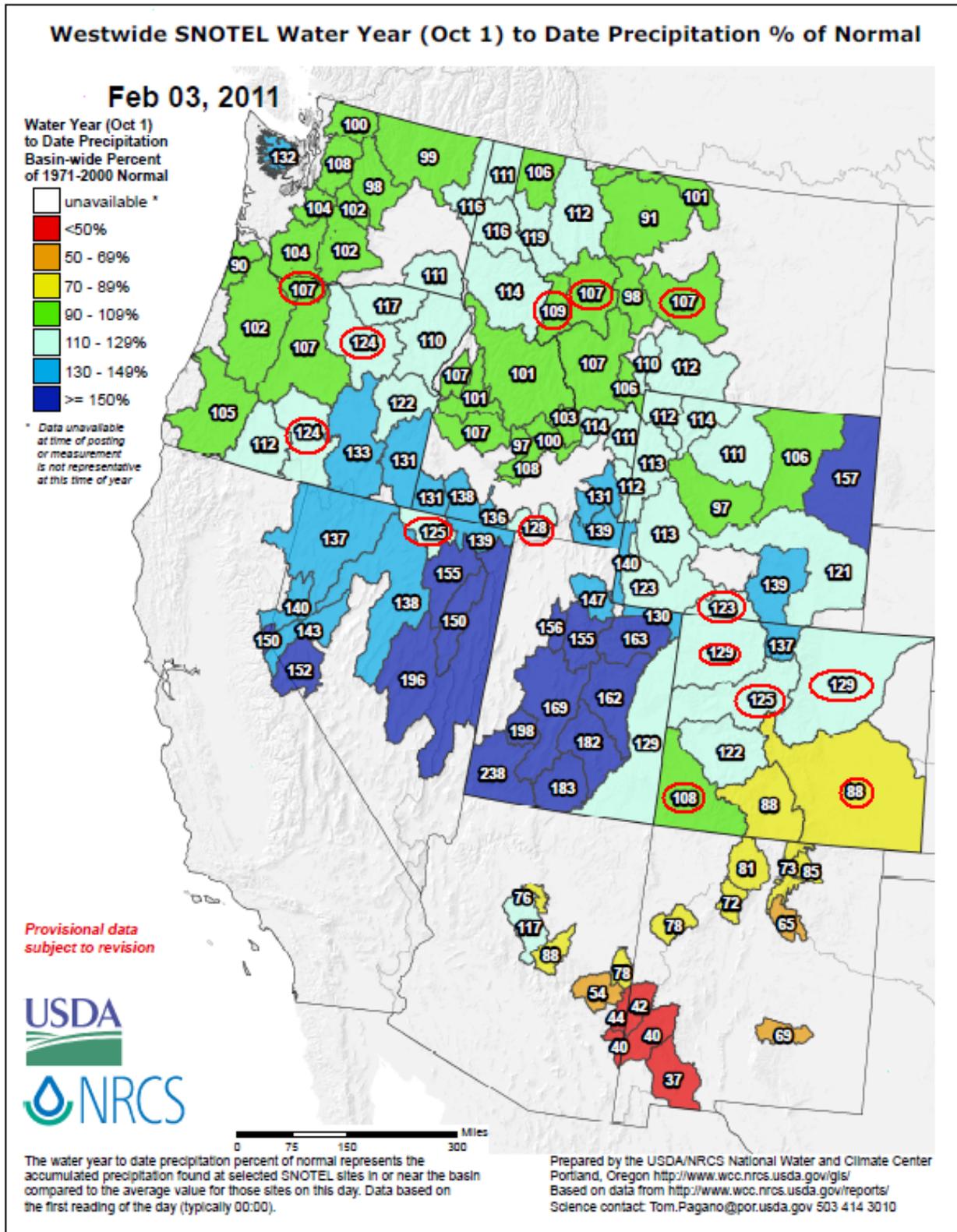
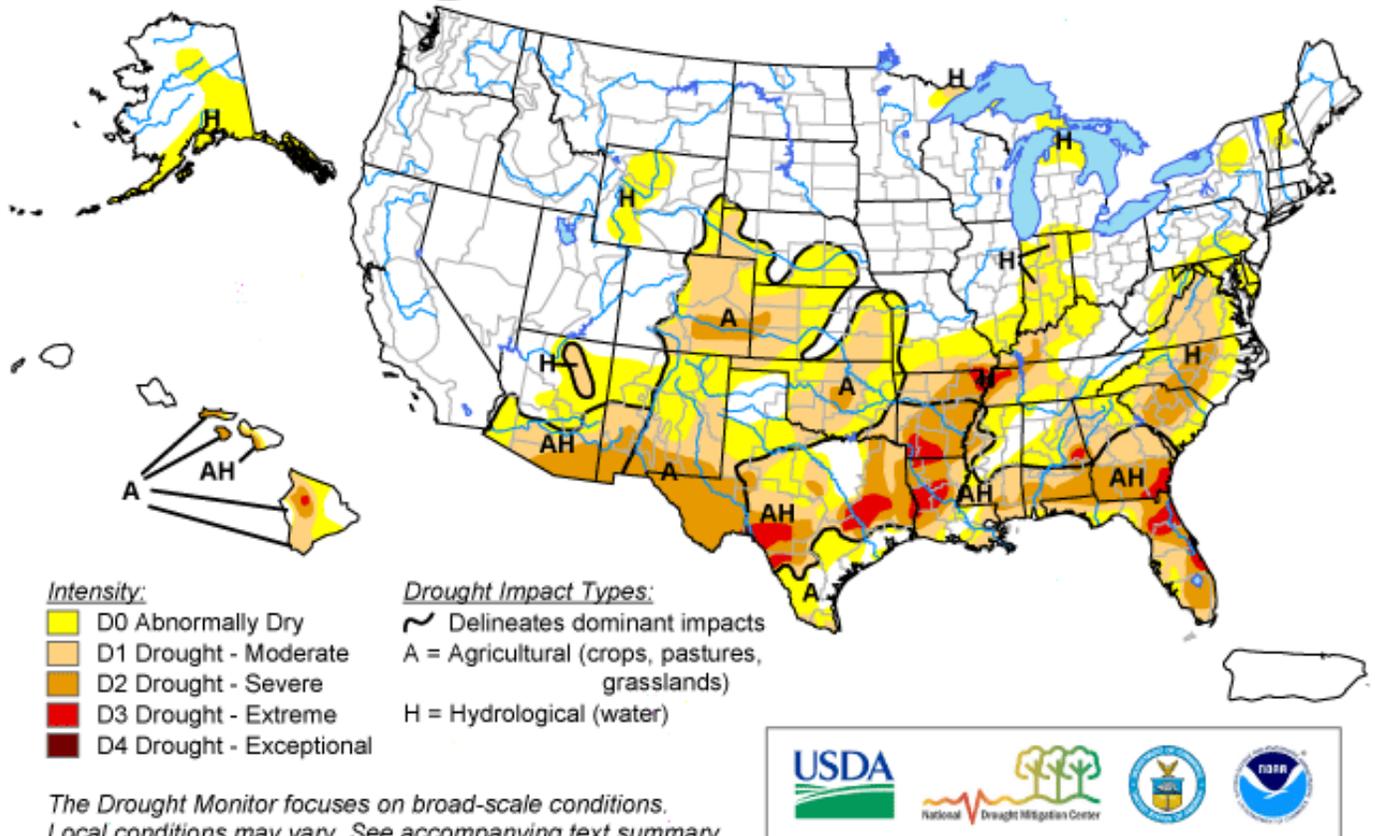


Fig 3b: For the 2011 Water-Year that began on 1 October 2010, the greatest deficits are found over the extreme southern reaches of the Southwest. Areas with the highest values are found over the Great Basin. A rather dry week was the rule over much of the West which resulted in one category deterioration as noted by the red circles.

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecpcnormal\\_update.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf)

# U.S. Drought Monitor

February 1, 2011  
Valid 7 a.m. EST



Released Thursday, February 3, 2011

Author: Richard Heim/Liz Love-Brotak, NOAA/NESDIS/NCDC

<http://drought.unl.edu/dm>

Fig. 4: Current Drought Monitor weekly summary. The severest D3 levels of drought dominate the Big Island of Hawaii and is scattered across Texas to Florida.

Ref: <http://www.drought.unl.edu/dm/monitor.html>

# U.S. Drought Monitor

## West

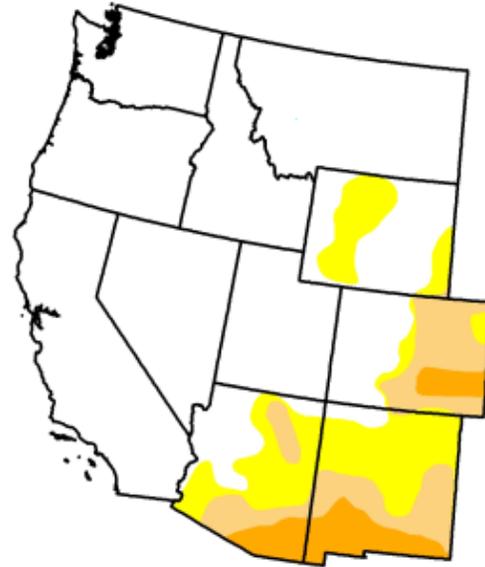
February 1, 2011  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	75.68	24.32	12.70	4.44	0.00	0.00
Last Week (01/25/2011 map)	76.62	23.38	12.70	2.44	0.00	0.00
3 Months Ago (11/02/2010 map)	69.02	30.98	5.39	0.19	0.00	0.00
Start of Calendar Year (12/28/2010 map)	73.26	26.74	11.98	0.89	0.00	0.00
Start of Water Year (09/28/2010 map)	62.50	37.50	8.14	0.56	0.00	0.00
One Year Ago (01/26/2010 map)	38.75	61.25	20.63	3.46	0.33	0.00

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

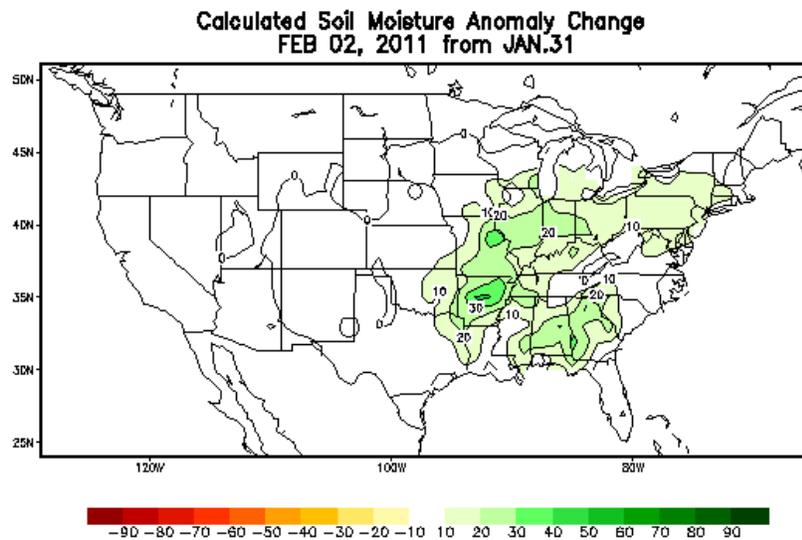
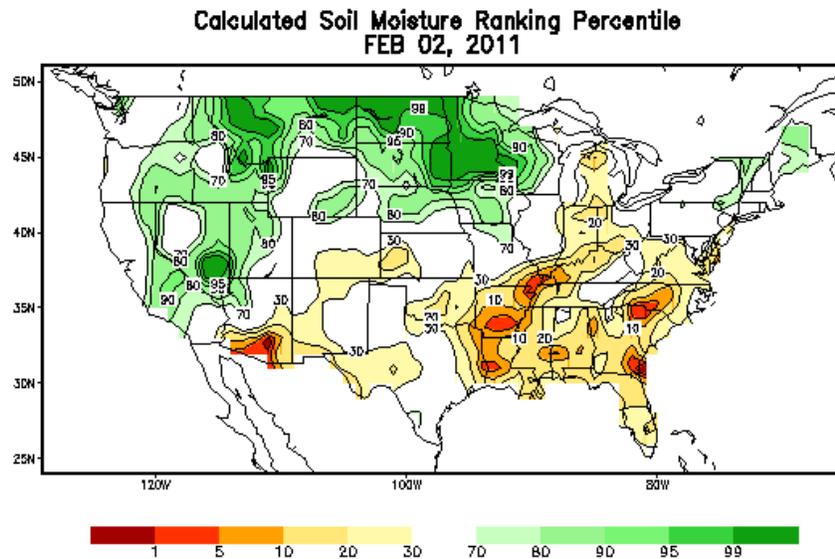
<http://drought.unl.edu/dm>



Released Thursday, February 3, 2011  
R. Heim/L. Love-Brotak, NCDC/NOAA

**Fig. 4a: Drought Monitor for the Western States with statistics over various time periods. Regionally there was some deterioration over the southern reaches of Southwest during the past week.** Ref: [http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm)

## Weekly Snowpack and Drought Monitor Update Report

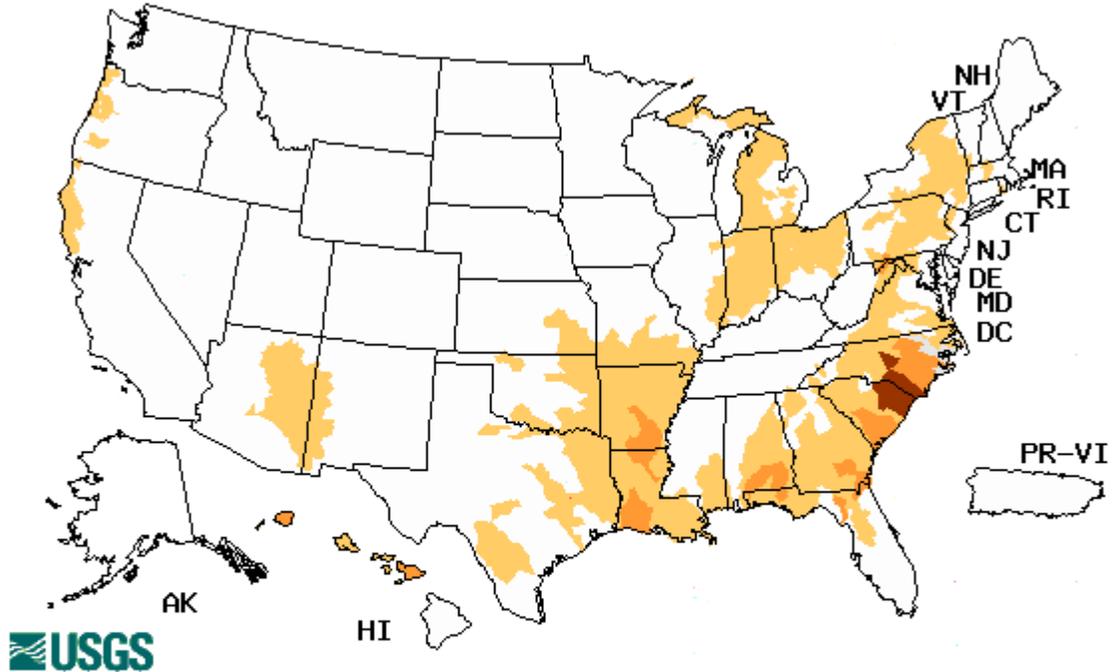


**Figs. 5a and 5b: Soil Moisture ranking in percentile as of 2 February (Fig. 5a) shows wet conditions over the Western and Northern areas of the West. Since the end of January, much of the mid-West has increased in moisture as the result of a major winter system that moved through this region (Fig. 5b).**

Ref: [http://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml#](http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)

# Weekly Snowpack and Drought Monitor Update Report

Wednesday, February 02, 2011



Explanation - Percentile classes				
Low	≤5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

**Fig. 6:** Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Portions of the Gulf States and Southeastern Tier States are reflecting La Niña conditions of dryness. Note: northern site gauges are less accurate as rivers and streams freeze. Ref: <http://waterwatch.usgs.gov/?m=dryw&r>

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- February 1, 2011

*The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.*

This U.S. Drought Monitor (USDM) week began with a strong cyclonic storm system moving across the southern and eastern U.S. and ended with another monster winter storm developing in the Southwest and moving into the Plains states. These systems brought rain and snow to many areas, with warmer-than-normal air ahead of them and a cool-down behind them.

Weaker weather systems brought spotty precipitation to parts of the western and northern states. While the storm systems were strong, precipitation amounts varied with only a few areas receiving above-normal amounts. Weekly precipitation totals ranged from half an inch to two or more inches over parts of the southern and eastern drought areas, with an inch or less of precipitation in a few areas of the West and Upper Midwest. Most of the Southwest and Intermountain Basin was generally dry.

**The Northeast and Mid-Atlantic:** Half an inch to an inch of precipitation fell over southern New England and the coastal Mid-Atlantic. In spite of the moisture, most of the region was drier than normal for the week. An area of D0 (abnormally dry) was introduced in northern Vermont to west central New Hampshire where 90-day precipitation departures were most significant. Precipitation was above normal over the Del-Mar-Va and over southern West Virginia, but the area in between has been persistently drier than normal, so D1 (moderate drought) expanded in the central mountain region of Virginia and adjoining east central West Virginia to reflect deficits at 30-90 days. D1 also expanded into southwestern Virginia to reflect January dryness.

**Southeast and Gulf Coast:** Precipitation extremes occurred in the Southeast. Two inches or more of rain fell over northern Florida, improving 2-month to 6-month deficits and resulting in the contraction of D0-D3. D3 (extreme drought) was also pulled back in eastern Florida over Volusia County and D1-D2 were trimmed in southwest Florida.

But a large area of D2 (severe drought) was added to the Carolinas, where dryness persisted. The dry conditions were reflected in several drought indicators across much of the central portions of North and South Carolina and Upstate South Carolina. As of the end of January, modeled soil moisture and streamflow measurements at 7-, 14-, and 28-day time scales ranked in the bottom 10 percentile of the historical record, with several stream levels at record low levels. Precipitation departures were 3 inches or greater for the last 30 days, with the last 90 days 6 to 8 inches below normal across a large part of the Piedmont of both Carolinas and Central South Carolina. The deficit in precipitation has resulted in low inflows to area reservoirs, with some ranking as the fifth lowest inflows in the 50 to 80-year record. Reservoir managers in North Carolina have continued minimum releases in order to maintain lake levels. It is unusual for reservoir managers to have to cope with minimum releases just to maintain lake levels during what is normally the winter recharge period. With agriculture dormant during this time of year, few drought impacts have been observed. But widespread impacts will quickly set in over

## Weekly Snowpack and Drought Monitor Update Report

the next few months as the temperatures begin to gradually increase and the growing season begins anew.

Improvement was made elsewhere along the Gulf Coast. D0 was pulled back to central Mississippi where rains from the bookend systems left standing water and shrank long-term deficits. The D3 in eastern Texas, Louisiana, and southwest Arkansas was split into three parts. D2 was pulled back in eastern Texas and northeast Louisiana. D1 and D2 contracted in west central Mississippi and southwest Louisiana.

**Great Plains and Midwest:** Precipitation was above normal in a streak from north central Texas to southwest Missouri, a streak from central Illinois to central Ohio, and a few isolated spots in the southern Plains. Otherwise, the Great Plains and Midwest drought areas received below-normal precipitation this USDM week. Widespread wildfires plagued Oklahoma at the beginning of the week, but a monster snowstorm at the end of the week dampened the flames. D1 was trimmed in northeastern Oklahoma around Tulsa, which reported a record 13.2 inches of snowfall in 24 hours. But D1 expanded in west central Oklahoma where snowfall was minimal and precipitation deficits continued to climb. D0H was introduced in parts of Upper Michigan and northern Lower Michigan where 90- to 120-day precipitation deficits were the most significant.

**The West:** Even though an inch or more of precipitation fell across parts of California and Washington, this is the rainy season and Normals are high, so most of the West had a drier-than-normal week. The few tenths of an inch of moisture that fell across parts of Arizona and New Mexico at the end of the week had little impact on the long-term deficits. So D2 expanded in southern Arizona, southern New Mexico, and the northern Trans Pecos of western Texas, essentially joining the previously existing D2 areas there. D0 expanded in central Arizona.

**Hawaii, Alaska and Puerto Rico:** The week was drier than normal across Puerto Rico and most of the Hawaiian Islands. Two inches or more of precipitation fell along the normally wet southern coast of Alaska, with lower amounts in the interior, and the week was warmer than normal across most of the state. But, because Normals are high this time of year, only a few stations from the southern coast to the Bering Strait were wetter than normal for the week. D0 expanded into east central and north central Alaska where snowpack was below normal and precipitation was below normal for the last 7 to 60 days and 6 months. In Hawaii, D3 was reduced in areal coverage over the central portion of the Big Island. Vegetation conditions improved in parts of the western slopes of Mauna Kea, but the Pohakuloa area of the Big Island remained extremely dry with a brush fire rating of "extreme".

**Looking Ahead:** The monster winter storm, which laid down a swath of heavy snow from the southern Plains to New England and brought beneficial rain to the Southeast drought areas during February 1-3, will exit the Northeast at the beginning of the forecast period. Another weather system will develop along the Gulf Coast February 3 and move up the Atlantic Seaboard, bringing above normal precipitation to the Gulf Coast and East Coast February 2-7. Areas of rain and snow are expected in the Pacific Northwest and northern to central Rockies during this period, while colder-than-normal temperatures will dominate most of the country.

The period February 8-16 will begin with an upper-level circulation pattern consisting of a dry ridge in the West and a cold trough in the central and eastern U.S. The pattern will flatten into a more westerly flow by the middle of the period. Colder-than-normal temperatures are expected to dominate the eastern two-thirds of the country, with a gradual warm-up from the southwest

## Weekly Snowpack and Drought Monitor Update Report

later in the period. The West Coast should start out warmer than normal. Precipitation is forecast to be drier than normal from the Southwest to southern Plains and wetter than normal in the East and along the northern tier states. The Alaska prognosis is for colder-than-normal temperatures statewide with drier-than-normal conditions in the south and east.

**Author:** [Richard Heim, NOAA/NESDIS/National Climatic Data Center](#)

### **Dryness Categories**

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

### **Drought Intensity Categories**

D1 ... Moderate Drought

D2 ... Severe Drought

D3 ... Extreme Drought

D4 ... Exceptional Drought

### **Drought or Dryness Types**

A ... Agricultural

H ... Hydrological

Updated February 2, 2011